

MEMORANDUM

TO: Mr. [redacted] pp  
 [redacted] neer  
 [redacted] Water Investigations Branch

FROM: J. C. Foweraker, Geological Engineer

May 25th 1964

SUBJECT: Ground-Water Possibilities at the Parks Branch  
Long Beach Campsite, Wickaninnish Bay, Vancouver Island

OUR FILE 0239013

YOUR FILE .....

Introduction

A field investigation was made during the period 13th - 17th May, of the surficial geology and possible sources of ground water at the Parks Branch Long Beach Campsite, Wickaninnish Bay, Vancouver Island (see Fig. 1). The investigation was carried out in response to a request for assistance by the Parks Branch in their letter dated April 10th, 1964, File No. 0239013

Possible Sources of Water near Long Beach Campsite

The Campsite is situated in a clay terrace, which would indicate that suitable supplies of ground water are unlikely to be found at a shallow depth - particularly as the veneer of sands and gravels appear to be very thin. The possibility of obtaining ground water below the terrace clays will be discussed in detail under the next section - recommendations for drilling. There is a possibility of further exploring the beach sands at the base of the terrace to the north and south of the campsite, with a view to digging a shallow well down to the underlying clays. Such a well would give only a very limited supply in the summer, and the previous wells dug in this area have not given satisfactory results either in quality or quantity of water obtained. There is also the question of pollution.

The nearest source of surface water capable of giving a supply during the summer months appears to be on a tributary of Sandhill Creek. This tributary crosses the main highway two miles southeast of the Long Beach Campsite (B, Fig. 1). The water in this tributary is discoloured and the quality has not been checked.

There are at least two possible supplies of water from the air port area to the northwest. Firstly, there is the dam constructed by the D.N.D. during the war, to the southwest of the airport (D, Fig. 1). A possible source closer to the campsite is near the Department of Transport's test hole No. 4 (see figure 3). The airport however is 2.5 miles from the Long Beach Campsite. Any scheme for using an outside water supply would however appear to be very costly, considering the distances involved in laying a pipeline to the Campsite.

Recommendations for Drilling

Hole No. 1 If an attempt is to be made to find ground water at the campsite, then it is recommended that an 8-inch diameter hole should be drilled on the terrace at the northwest end of the Long Beach Campsite (see Fig. 2). This hole may possibly have to go to a depth of 400 feet. It is suggested that initially samples be taken

File  
 Parks Branch has received a copy of this  
 J.C.F., June 4/64 2 . . . .

Mr. V. [redacted] sepp

May 25th, 1964

every 10 feet. However it is important that lenses of sand or gravel which might be encountered at any depth on the way down be sampled every two feet, and that tests be made if necessary to test the quality and quantity of the water at these horizons. A "Haack" portable water-testing kit could be used to evaluate the quality of the water.

Hole No. 1 may possibly penetrate water-bearing sand and gravels beneath the stony clay deposit. This reasoning is based on the presence of gravels below a depth of 254 feet in the deep hole at A, Fig. 1). It should be noted however that the gravels and sands which overlie the stony clay terrace at site A do not appear to extend as far north as the Long Beach Campsite. There is also the possibility of sands and gravels being contaminated with salt water as was encountered at site A. According to Todd 1959, it is recommended that the chloride content should not exceed 250 p.p.m. in drinking water; sea water has a chloride content of 19,000 p.p.m.

Hole No. 2 If Hole No. 1 is unsuccessful then it is suggested that an attempt be made to drill a well in bedrock, to a sufficient depth to obtain a limited ground-water supply. This recommendation would be subject of course, to any information obtained from hole No. 1. It is recommended that a smaller diameter than eight inches be used for this hole.

Bedrock is exposed at the south end of the site but it would be necessary to select a site some distance inland from the rock promontory to lessen the chance of salt water contamination. At what depth bedrock would be encountered inland from the spur under the embankment is not known. Rock is known to outcrop to the north near Kootowis Creek (Fig. 1). Portable seismic refraction equipment might be used here to obtain a profile over the buried bedrock surface, and could assist in the best location for a rock well. There are of course, definite limitations on the depths to which this portable seismic equipment can be successfully used.

*J. C. Foweraker*

J. C. Foweraker

JCF/lis

NOTES ON THE TOPOGRAPHY, SURFICIAL GEOLOGY AND GROUND WATER OF THE LONG BEACH  
CAMPSITE AND THE TOFINO - UCLUELET AREA

---

Long Beach campsite is located for the most part on a prominent terrace about 110 feet above sea level. A steep forested slope extends from the campsite down to the beach below. At the southern end of the site, a rock promontory extends out into the Long Beach Shelf (see Fig. 2). Silty clays and clayey silts often containing stones are exposed at the side of the two tracks leading down to the beach. A thin veneer of sands and gravels covers the terrace. Water has been ponded in several shallow depressions around the campsite.

The Parks Branch have already installed a shallow dug well on the beach at the base of the terrace escarpment (see Fig. 2). The water is of poor quality. This well water originates, I believe, mainly from surface flows and near surface seepage water from the embankment above. This source would decrease rapidly after the wet season. Adjacent to the Long Beach Campsite on Lot 140 (Whittington's property) a well has been dug 15 feet through beach sands and gravels to a clay bottom. Supply is hardly sufficient for small domestic needs during the summer months. A well has also been dug in beach sands below the terrace, immediately to the southeast of the site on Baxter's property. According to Mr. T. Gibson, general contractor of Tofino, piles were driven into the beach shelf during the war, and penetrated into clay beneath about 15 feet of sand. It would appear then that clays extend out a considerable distance as a shelf under the beach sands.

Further southeast along the coast from Sandhill Creek (Fig. 1) are a series of sand dunes in part covered by vegetation and trees. Dug wells located in these sands at the southeast end of Long Beach, have produced good domestic supplies.

Near the highway turnoff to the Wickaninnish Lodge and west along this road towards the sea, sands and gravels overlie stony blue clay. A section exposed near the west end of this road on the terrace (see A, Fig. 1) shows two feet of sand overlying six feet of boulders and gravels. Underlying the gravels are stony clays. A hole was drilled from a site on the terrace to a depth of 274 feet, in an attempt to find a domestic ground-water supply (site located at A, Fig. 1). Salt water was encountered in tightly bound silty sand and gravel between 252 and 274 feet, and the hole was abandoned. The log for this is as follows:

0 - 28 feet	No. record
28 - 34 feet	Loose coarse gravel
34 - 38 feet	Brown clay hardpan
38 - 72 feet	Light blue clay
72 - 116 feet	Blue silty clay with lenses of fine silty sand - making some water - static level 65 feet
116 - 252 feet	Blue clay hard
252 - 274 feet	Silty sand and gravel, tightly bound, making salt water
274 feet	End of hole

The sands and gravels overlying the stony clays increase in thickness towards Florencia Bay or Wreck Bay as it is commonly called, and these deposits should form a good source of ground water above the contact with the underlying blue stony clays. The surficial deposits within Wreck Bay are discussed by G. S. Stevenson in connection with former placer workings, in the Annual Report of the Minister of Mines for 1936 Part F - Special Report (copy of file in this office).

A description of the Wreck Bay surficial geology is as follows. Wreck Bay Beach extends for three miles between two rocky headlands and is bounded by an escarpment of these superficial deposits which have been designated as the Wreck Bay formation by Dolmage. This escarpment is the front of a gravel plain that extends from the beach back north eastward to Kennedy Lake, a distance of about 4 miles. The sea cliffs range in height at the beach from 63 feet to 145 feet. The material of this plain as exposed in the sea cliff consists of a well-stratified series consisting of basal clay and overlying sand and gravel. The sands and gravels occur in alternating layers from a few inches up to 8 feet in thickness. The pebbles and boulders are well-rounded and range in size from small to six inches in diameter, a two-inch size being very common. Some perfect specimens of shells were collected from the stony blue clays about three feet below the contact with the overlying gravels. The specimens were collected near the mouth of Lost Shoe Creek and are at present held at this office.

North of the Long Beach Campsite, MacMillan, Bloedel and Powell River Ltd., has constructed several logging roads (see Fig. 4). Road cuts in recently logged areas have exposed clay but no gravels or sand. Sinuous depressions ten to twenty feet deep have also been incised in these clays. The lack of gravel deposits in the area north of the campsite has meant that road-building materials have had to be hauled in from outside the area.

The terrace at the Long Beach campsite also extends to the northwest towards the airport but at a decreased height. The airport is situated about 70 feet above sea level on a fairly flat area, which is covered by a variable thickness of silts, silty sands and fine-grained cross-bedded sands with some pebbles. Underlying the silts and sands are the stony blue clays.

The Department of Transport have carried out an exploratory test drilling program for a ground-water supply at Tofino Airport. The location of these test holes are shown in Fig. 3, and logs for these holes are on file at this office. Test holes 4, 5, 6 and 11 appear to be located over a depression in the underlying blue clays. This depression has subsequently been filled with water-bearing silts, sands and gravels.

The Department of Transport has just completed drilling a new well 50 feet from test hole No. 5. Pumping tests had not been carried out at the time of the field investigation. The new 6-inch well is 100 feet deep. A six-inch, no. 7 slot, Johnson stainless steel screen, 30 feet long has been installed with its base at a depth of 100 feet approximately. A log of this new well is as follows:

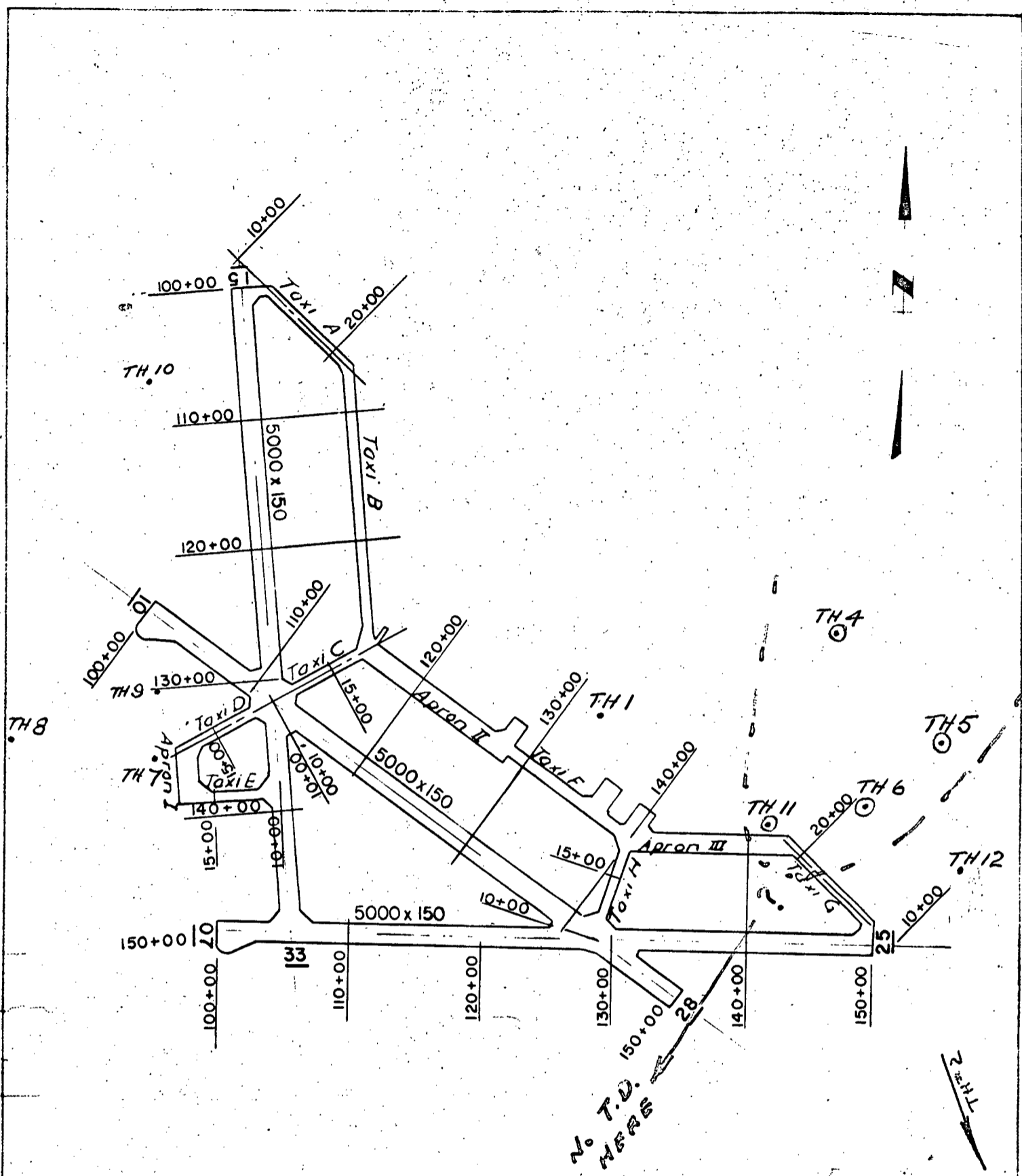
0 -	2	Old Fill
2 -	5	Top soil, silty sand, small cobbles
5 -	12	Silty sand - brown, layers of clay and silt.
12 -	17	Sandy silt - firm, easy drilling.
17 -	23	Clayey silt
23 -	27	silty sand - brown, layers of clayey sand
27 -	35	Silty sand - brown
35 -	60	Silty sand - Brown and firm, very hard layers - reddish brown
60 -	70	Silty clay - brown, thin sand layers - brown and firm Silty sand.

70 - 80 Fine silty sand, occasional pebbles and shells.  
80 - 94 Fine to medium silty sand, occasional pebbles and shells.  
94 - 97 Very fine silty sand  
Sand - soft.  
97 - 100 Fine to medium silty sand.  
100 End of hole.

Static level 36 feet 4 inches.



*J. C. Foweraker*

J. C. Foweraker



TEST HOLE #2, WAS AT INTERSECTION OF AIRPORT AND TOFINO - UCLUELET ROADS, AND WAS A DRY HOLE.

Figure 3

WATER BEARING   
 NON WATER BEARING 

DATE	REVISION	BY

DEPT. OF TRANSPORT  
 TOFINO, B.C.

TEST WELLS

SCALE 1" = 1000'

Date: FEB. 1963

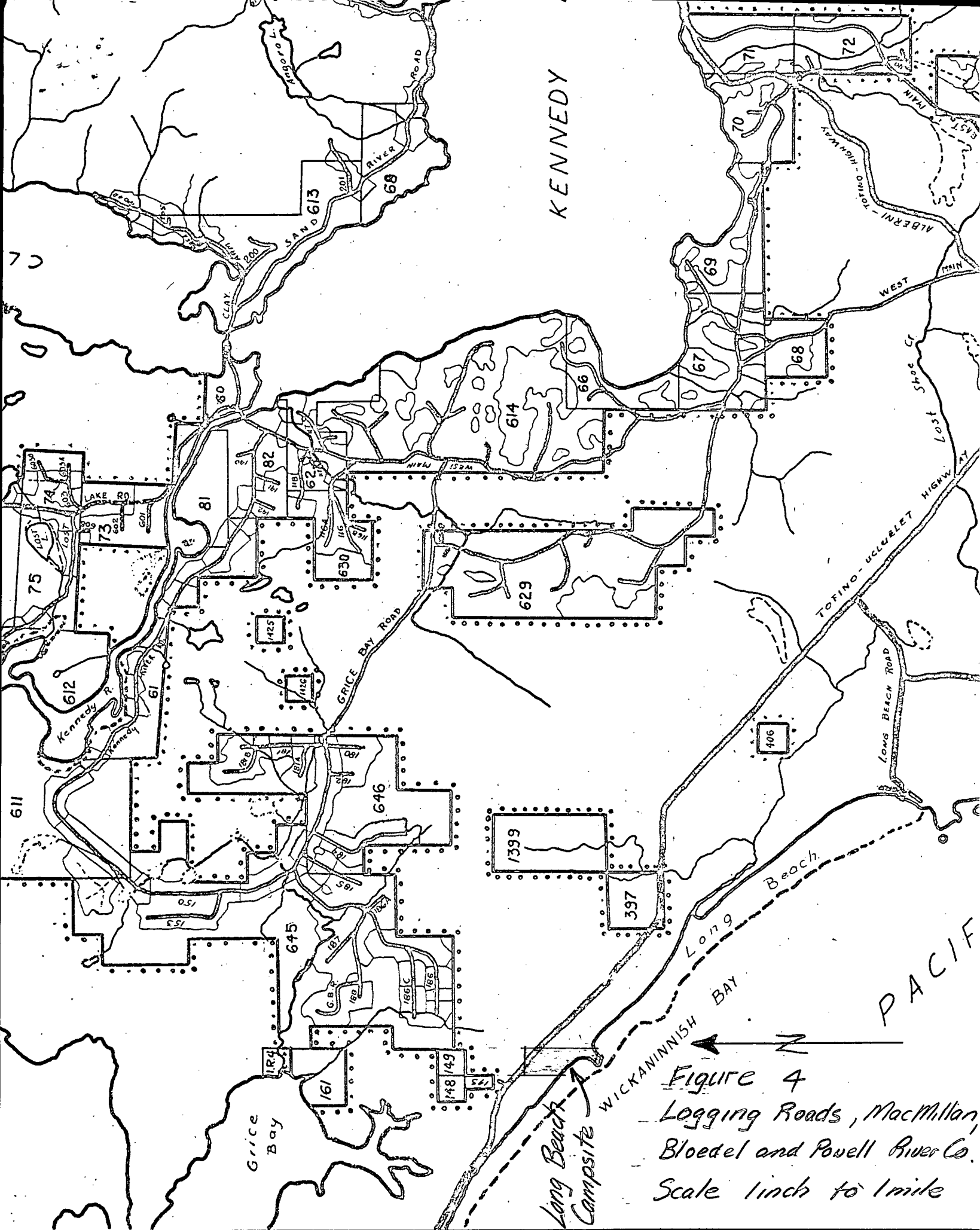


Figure 4  
 Logging Roads, MacMillan,  
 Bloedel and Powell River Co.  
 Scale 1 inch to 1 mile

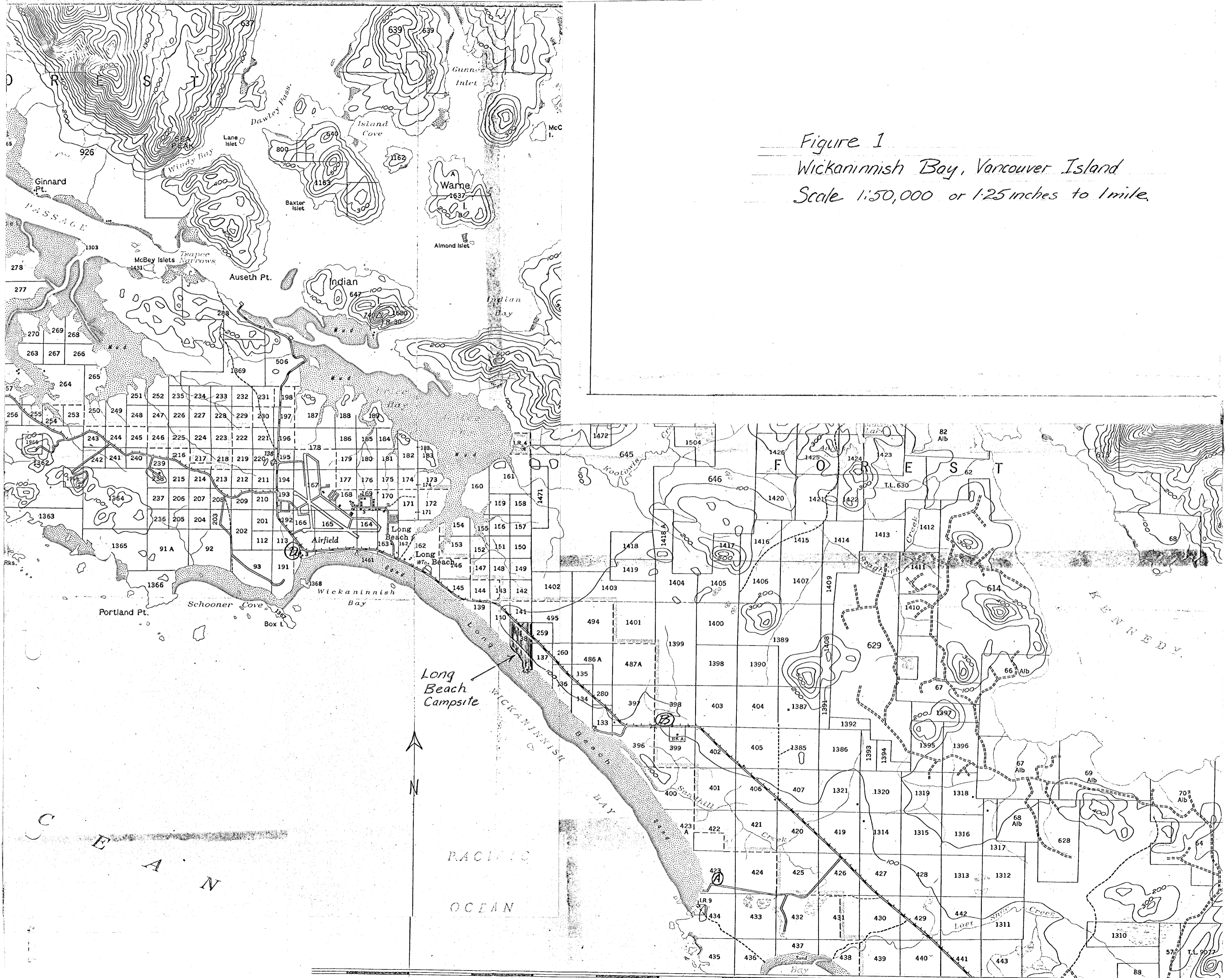


Figure 1  
Wickaninnish Bay, Vancouver Island  
Scale 1:50,000 or 1.25 inches to 1 mile.



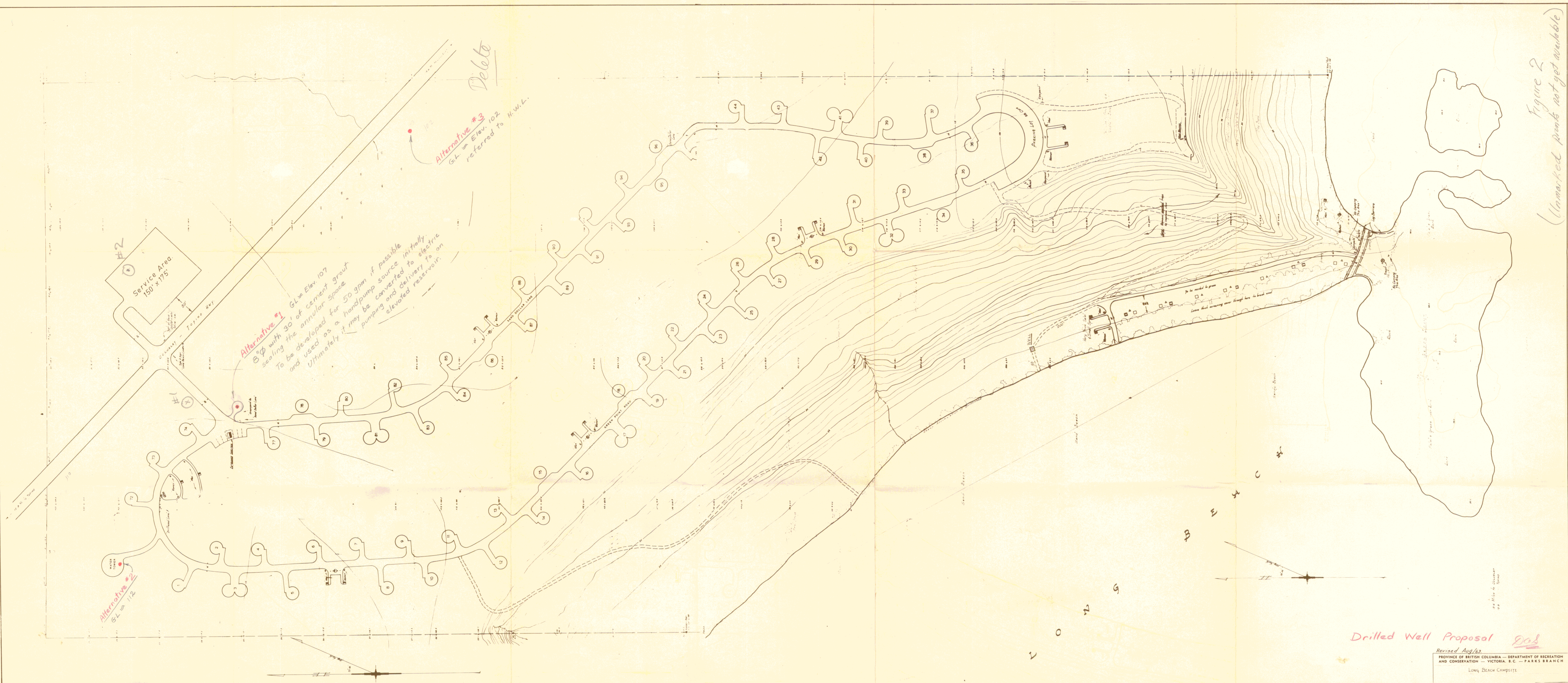


Figure 2  
(Unmarked points not yet available)

Drilled Well Proposal 208

Revised Aug/63  
 PROVINCE OF BRITISH COLUMBIA - DEPARTMENT OF RECREATION AND CONSERVATION - VICTORIA, B.C. - PARKS BRANCH  
 LONG BEACH CAMPSITE  
 SCALE 1" = 100'  
 DRWG. 8-16